EJVES Extra **8**, 17–19 (2004)
doi: 10.1016/j.ejvsextra.2004.05.010, available online at http://www.sciencedirect.com on SCIENCE DIRECT®

SHORT REPORT

Aorto-enteric Fistula Secondary to the Cannibalization of an Aortic Graft

O. Young*, P. Neary and D. Mehigan

Department of Vascular Surgery, Saint Vincent's University Hospital, Elm Park, Dublin 4, Ireland

Key Words: Aorto-enteric fistula; Cannibalization; Aortic graft.

Introduction

The incidence of graft-enteric fistulæ following aortic aneurysm repair ranges from 0.4 to 2.4% with duodenal involvement in 75% of cases and carries a mortality rate approaching 55%.[1,2] Graft-enteric erosion is an even rarer complication of aortic surgery. We report a case of graft-enteric erosion following trouser graft for aorto-iliac occlusive disease that involved complete cannibalization of the limb of the graft into the ileal lumen.

Report

A 56-year-old female with an aorto-bifemoral graft *in situ* presented with a 1-month history of intermittent melæna. Clinical examination revealed tenderness in the left iliac fosa. Her haemoglobin was 5.6 g/dl. After three units of red cell concentrate gastroscopy and colonoscopy were found to be normal. She was transferred to our institution and had a CT abdomen (Fig. 1). This revealed inflammatory changes in the region of the aorto-bifemoral graft at the level of the graft bifurcation, with formation of a false lumen and absence of flow in the left limb of the graft (Fig. 2).

The patient originally had an aorto-bifemoral graft inserted 6 years previously for aorto-iliac occlusive disease. The left limb of this graft occluded resulting in left limb thrombectomy and profundaplasty 12 months later. She underwent a further graft thrombectomy and left femoro-popliteal bypass the following year. Four months later, a left ilio-popliteal graft was inserted with re-attachment of the profunda femoris. This occluded, necessitating a graft thrombectomy with a jump graft to the posterior tibial artery. Disease progression continued, resulting in a left above-knee amputation 3 years from her initial surgery.

Exploratory laparotomy following her CT revealed the left limb of the graft to be 'cannibalized' into the lumen of a small intestinal loop. The graft lay within the small bowel lumen, surrounded by local inflammatory tissue, without pus. Her episodes of bleeding appeared to have originated from contact irritation of the prosthesis at the entry point of the graft into the enteric lumen. With no gross evidence of active infection or bowel content leakage, we carried out a segmental small bowel resection of the affected loop with a side-to-side anastamosis. The left limb of the graft was then removed and the stump was oversewn. Culture of the graft yielded *Enterobacter*, *E. coli*, *Enterococcus*, *Serratia* and *Citrobacter* species. She received intravenous ciprofloxacin, flucloxacillin, metronidazole and gentamicin for 2 weeks, followed by oral antibiotics for 6 weeks. Histology revealed a segment of bowel showing perforation, with surrounding mucosal ulceration and granulation tissue. Adjacent bowel showed numerous subserosal and serosal lymphoid aggregates. She was discharged home well 18 days following her admission.

Discussion

The diagnosis of graft-enteric fistula is dependent

*Corresponding author. Dr O. Young, Forramoyle West, Barna, Co Galway, Ireland.

1533–3167/020017 + 03/0

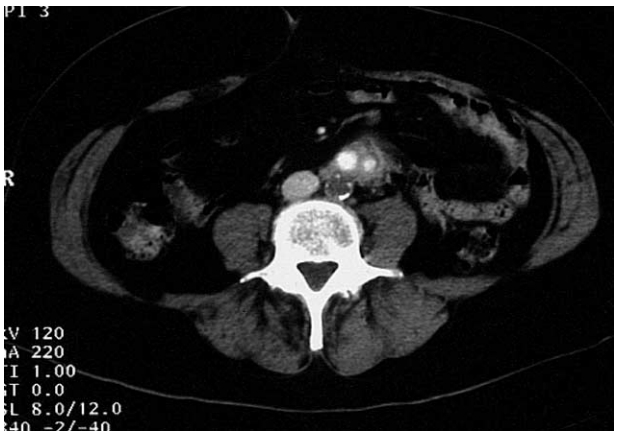

Fig. 1. CT abdomen showing inflammation at the level of bifurcation of the graft.

upon clinical vigilance and optimum imaging. The heralding sign of rectal bleeding is absent in 38% of cases and presentation may be both acute and catastrophic in nature.[3] The most important factors favouring a good outcome are an early diagnosis and early intervention. Surgery is the only viable chance of a cure, but mortality rates still remain in the order of 46–55% of cases.[4] More recently, several authors have advocated *in situ* graft replacement rather than an extra-anatomical bypass (axillo-bifemoral).[5–8] Indeed graft excision and axillo-bifemoral bypass may carry an increased risk of limb loss, aortic stump blowout and pelvic ischaemia while having similar re-infection rates to *in situ* graft replacement.[5,6] With the introduction of endovascular stenting the incidence of graft-enteric fistulæ may alter. This technique avoids the use of a suture line and with regular imaging follow-up a further stent deployment in suspected cases is feasible. Two case reports describe the development of an

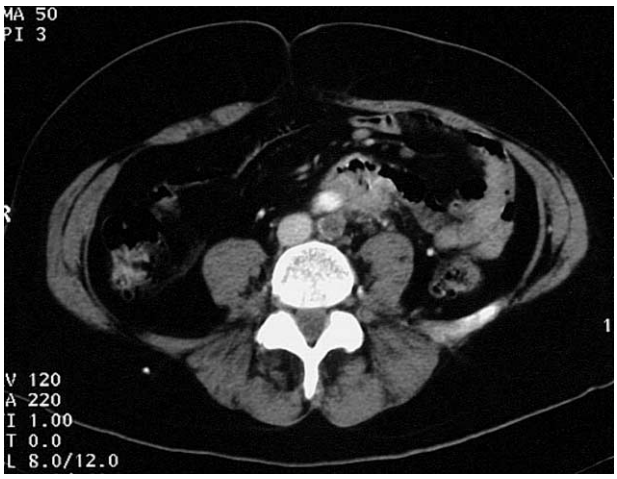

Fig. 2. CT abdomen showing inflammation and involvement of small bowel loop, no definite fistula.

aorto-enteric fistula using aortic endografts.[9,10] However, it may be too early to clarify whether this technique has a lower incidence of such problems. Burks published the result of a 5-year series of endovascular repair of aorto-enteric fistulæ.[11] Similar isolated reports have also demonstrated its' viability as an operative technique in recent years.[12,13] The morbidity and mortality of endovascular repair for these cases seems superior to the conventional open approach and may well be the way forward.

Our case is highly unusual as the graft was completely engulfed by the small bowel lumen. The findings at surgery were quite remarkable with a clean graft stump lying 'naked' within the peristaltic waves of the ileum. The graft itself had thrombosed and her distal bleeding was from contact abrasion in the moving lumen. There had been no enteric content leakage and there was a noted absence of pus. Monson *et al.* was first to describe cannibalization of a vascular prosthesis (6 mm Gore-Tex tube graft) by the duodenum.[14] In this case, the patient had presented with predominantly gastrointestinal upper abdominal pain 9 months after an infrarenal aortic to proximal hepatic artery bypass. At surgery the prosthesis was excised from the third part of the duodenum and the patient recovered without any ill effects. These authors were unable to determine any possible underlying aetiology. In a further comment on this initial report Cotton describes his experience with a patient that also had cannibalization of the proximal end of an aorto-iliac graft (woven Teflon) at the level of the duodenum.[15] In this second case the patient had evidence of graft sepsis and graft thrombosis. Once again excision of the graft using a formal duodenotomy proved uneventful for the patient. More recent reports are that of endoscopically detected graft-enteric erosions without evidence of complete cannibalization.[16,17]

The majority of aortic graft-enteric fistulæ occur at the fourth part of the duodenum. This is considered to be due to initial pressure necrosis on the adjacent serosa by the adherent graft, followed by local sepsis, suture line haemorrhage and false aneurysm formation.[18] Preventive measures at the time of initial surgery include technical perfection of the anastomosis, prevention of false aneurysm or haematoma formation, coverage of the graft with an omental flap and full mobilization of the fourth part of the duodenum. These measures aim to separate intimate contact between the graft and the serosal surface. It is often more difficult technically to isolate the limbs of bi-femoral grafts from the viscera; however, the suture lines are not anatomically exposed to the bowel. This may explain the paucity of reports of erosion or fistulization of the grafts into the bowel at other sites

distant from the anastomotic lines. In our case, we believe the aetiology was due to contact erosion with superimposed sepsis.

Conclusion

Graft-enteric fistulæ remain a catastrophic complication of aortic aneurysm repair. Treatment options have radically altered in recent years with the introduction of endovascular stenting. Though extremely rare, graft enteric erosions may ultimately progress onto full cannibalization of the graft into the bowel lumen. In our case, a segmental bowel resection with excision of the graft limb appears to have provided a successful outcome.

References

1 Girardi A, Piazza I. Infection and digestive bleeding: late complications of aortofemoral bypass surgery. *Minerva Med* 1988; **79**(12):1095–1099.
2 Kiernan PD, Pairolero PC, Hubert Jr. JP, Mucha Jr. P, Wallace RB. Aortic graft-enteric fistula. *Mayo Clin Proc* 1980; **55**(12):731–738.
3 Reilly LM, Ehrenfield WK, Goldstone J, Stoney RJ. Gastrointestinal tract involvement by prosthetic graft infection. The significance of gastrointestinal haemorrhage. *Ann Surg* 1985; **202**(3):342–348.
4 Kleinman LH, Towne JB, Bernhard UM. A diagnostic and therapeutic approach to aorto-enteric fistulas: clinical experience with twenty patients. *Surgery* 1979; **86**:868–880.
5 Young RM, Cherry Jr. KJ, Davis PM, Gloviczki P, Bower TC, Panneton JM. The results of *in situ* prosthetic replacement for infected aortic grafts. *Am J Surg* 1999; **178**(2):136–140.
6 Sharp WJ, Hoballah JJ, Mohan CR, Kresowik TF, Martinasevic M, Chalmers RT, Corson JD. *J Vasc Surg* 1994; **19**(5): 844–850.
7 Bandyk DF, Novotney ML, Back MR, Johnson BL, Schmacht DC. Expanded application of *in situ* replacement for prosthetic graft infection. *J Vasc Surg* 2001; **34**(3):411–419.
8 Kieffer E, Bahnini A, Koskas F, Ruotolo C, Le Blevec D, Plissonnier D. *In situ* allograft replacement of infected infrarenal aortic prosthetic grafts: results in forty-three patients. *J Vasc Surg* 1993; **17**(2):349–355.
9 Norgen L, Jernby B, Engellau L. Aortoenteric fistula caused by a ruptured stent-graft: a case report. *J Endovasc Surg* 1998; **5**(3): 269–272.
10 Janne d'Othee B, Soula P, Otal P, Cahill M, Joffre F, Cerene A, Rousseau H. *J Vasc Surg* 2000; **31**(1 Pt 1):190–195.
11 Burks Jr JA, Faries PL, Gravereaux EC, Hollier LH, Marin ML. Endovascular repair of bleeding aortoenteric fistulas: a 5-year experience. *J Vasc Surg* 2001; **34**(6):1055–1059.
12 Chuter TA, Lukaszewicz GC, Reilly LM, Kerian RK, Faruqi R, Sawhney R, Wall SD, Canto C, LaBerge JM, Gordon RL, Messina LM. Endovascular repairof a presumed aortoenteric fistula: late failure due to recurrent infection. *J Endovasc Ther* 2000; **7**(3):240–244.
13 Grabs AJ, Irvine CD, Lusby RJ. Stent-graft treatment for bleeding from a presumed aortoenteric fistula. *J Endovasc Ther* 2000; **7**(3):236–239.
14 Monson JRT, Courtney DF, Jones NAG, Kester RC. Cannibalization of a Gore-tex aortohepatic graft by the duodenum. *Br J Surg* 1985; **72**:101.
15 Cotton LT. Cannibalization of a Gore-tex aortohepatic graft by the duodenum (Correspondence). *Br J Surg* 1985; **72**(6):499.
16 Iosca A, Dell'Abate P, Galimberti A, Piccolo P, Tincani G, Foggi E. *Surg Endosc* 2001; **15**(10):1226.
17 Malaki M, Perkins JM, Mortensen NJ, Hands LJ. Graft-enteric erosion: an unusual colonoscopic diagnosis. *Eur J Vasc Endovasc Surg* 2001; **21**(3):283–284.
18 Tilanus HW, Terpstra OT, de Smit P, van Urk H, Veen HF. Diagnosis and management of graft-enteric fistulæ. *Br J Surg* 1988; **75**:915–916.

Accepted 25 May 2004